

**A NEW SPECIES OF THE SUBGENUS *CAMPOMYRMA* WHEELER
OF THE GENUS *POLYRHACHIS* FR. SMITH FROM THE
AUSTRALIAN CAPITAL TERRITORY
(HYMENOPTERA: FORMICIDAE: FORMICINAE)**

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Abstract

Polyrhachis smithersi, a new species of the *hexacantha* complex of the subgenus *Polyrhachis* (*Campomyrma*) Wheeler, is described from the Australian Capital Territory. A key distinguishing it from the three other described species of the complex is provided. All four species are illustrated and their distribution data summarised.

Introduction

The *hexacantha* complex of *Polyrhachis* (*Campomyrma*) Wheeler comprises four species: *P. fuscipes* Mayr, *P. hexacantha* (Erichson), *P. semipolita* André and a new species described below. All four are rather similar and share many characters, including a distinctly slender mesosoma, a propodeal dorsum with two slender, posteriorly directed spines and a petiole with elongated lateral spines and a pair of shorter intercalary spines or teeth. Taylor (1989) also considered these species to be closely related and ‘similar and distinguished primarily by sculptural differences. *P. fuscipes* is less regularly and coarsely sculptured than *P. hexacantha*, while *P. semipolita* has all body surfaces remarkably smooth and strongly reflective. The 3 species seem to be similarly distributed (except that *P. hexacantha* ranges north to the New England Tableland) and are likely closely sympatric in parts of southeastern Australia and Tas.’ [Tasmania]. His opinion on their sympatric association has been confirmed, with three species of the complex collected by the author in close proximity at the type locality of the new species, Smokers Gap in the Australian Capital Territory.

Methods

Photographs of the specimens were taken with a digital camera attached to a stereomicroscope and processed using Auto-Montage (Syncroscopy, Division of Synoptics Ltd, USA) and Adobe Photoshop CS2 (Adobe Systems Inc., USA). Images of *P. smithersi* sp. n. depict the holotype, those of *P. hexacantha*, *P. fuscipes* and *P. semipolita* depict the types or type-compared specimens from the ANIC collection. All specimens were photographed by Dr Steve O. Shattuck (ANIC).

The standard measurements and indices mainly follow those of Kohout (2008): TL = Total length (the necessarily composite measurement of the outstretched length of the entire ant measured in profile); HL = Head length (the maximum measurable length of the head in perfect full face view, measured from the anterior-most point of the clypeal border or teeth to the

posterior-most point of the occipital margin); HW = Head width (width of the head in perfect full face view, measured immediately in front of the eyes); CI = Cephalic index ($HW \times 100/HL$); SL = Scape length (length of the antennal scape, excluding the condyle); SI = Scape index ($SL \times 100/HW$); PW = Pronotal width (greatest width of the pronotal dorsum, measured behind the pronotal teeth); MTL = Metathoracic tibial length (maximum measurable length of the tibia of the hind leg). All measurements were taken using a Zeiss (Oberkochen) SR stereomicroscope at 20x and 32x magnifications with an eyepiece graticule calibrated against a stage micrometer. All measurements are expressed in millimetres (mm).

Abbreviations. General: acc. – accession/s; ACT – Australian Capital Territory; for. – forest; N.P. – National Park; NSW – New South Wales; Rd – Road; rf. – rainforest; sclero. – sclerophyl forest; TAS – Tasmania; VIC – Victoria; w – worker/s.

Institutions (with names of cooperating curators): AMSA – Australian Museum, Sydney, NSW, Australia (Drs D. Britton, D. Smith); ANIC – Australian National Insect Collection, CSIRO Entomology, Canberra, ACT, Australia (Dr S.O. Shattuck); BMNH – The Natural History Museum, London, UK (B. Bolton, S. Reider); CASC – California Academy of Sciences, San Francisco, CA, USA (Dr B.L. Fisher); MCZC – Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA (Dr S.P. Cover); MNHU – Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (Dr F. Koch); MVMA – Museum Victoria, Melbourne, VIC, Australia (Dr K. Walker); NHMW – Naturhistorisches Museum, Wien, Austria (Drs H. Zettel, D. Zimmermann); OXUM – Hope Entomological Collections, University Museum, Oxford, UK (Dr D.J. Mann); QMBA – Queensland Museum, Brisbane, QLD, Australia (Dr C.J. Burwell); ZMSG – Zoologische Staatssammlung, München, Germany (Dr E. Diller).

Systematics

Genus *Polyrhachis* Fr. Smith, 1857

Polyrhachis Fr. Smith, 1857: 58. Type species: *Formica bihamata* Drury, 1773, by original designation.

Subgenus *Campomyrma* Wheeler, 1911

Campomyrma Wheeler, 1911: 860 (as subgenus of *Myrma* Billberg, 1820 = *Polyrhachis* Fr. Smith, 1857). Type species: *Polyrhachis clypeata* Mayr, 1862 (junior synonym of *Polyrhachis exercita* Walker, 1859), by original designation.

Key to workers of *P. hexacantha* complex

- 1 Smaller species ($HL < 1.81$); lateral petiolar spines only weakly divergent in dorsal view, forming a continuous line with sides of petiolar node (Fig. 2) *P. smithersi* sp. n.
- Larger species ($HL > 1.95$); lateral petiolar spines widely divergent, strongly extending laterally before curving posteriorly (e.g. Fig. 9) 2

- 2 Body very smooth, highly polished *P. semipolita* André
 - Body finely sculptured 3
- 3 Dorsum of mesosoma very finely and somewhat longitudinally striate; sculpturation of head distinctly finer, semipolished; intercalary spines of petiole only moderately long (Figs 6-7) *P. fuscipes* Mayr
 - Dorsum of mesosoma regularly reticulate-punctate, opaque; intercalary spines of petiole distinctly longer (Figs 9, 11-12)
 *P. hexacantha* (Erichson)

***Polyrhachis smithersi* sp. n.**

(Figs 1-2, 4-5)

Types. *Holotype* worker: AUSTRALIAN CAPITAL TERRITORY, Smokers Gap, Corin Dam Rd., 35°31'S, 148°54'E, 1240 m, 18-19.ii.2001, dry open forest, at night, R.J. Kohout acc. 01.3. *Paratypes*: 9 workers, queen, data as for holotype; 7 workers, as for holotype except 28-29.x.1973, R.J. Kohout acc. 73.138; 7 workers, as for holotype except 20.i.1982, R.J. Kohout acc. 82.40. Type distribution: Holotype, 5 paratype workers and paratype queen in ANIC; 8 paratype workers in QMBA; 2 paratype workers each in AMSA, BMNH, CASC, MCZC and MVMA.

Description. Worker. Dimensions (holotype cited first): TL c. 7.41, 6.60-7.41; HL 1.81, 1.65-1.81; HW 1.53, 1.37-1.53; CI 84, 81-85; SL 1.87, 1.78-1.87; SI 122, 122-134; PW 1.12, 1.06-1.15; MTL 2.18, 2.00-2.18 (6 measured).

Mandibles with 5 teeth. Anterior clypeal margin widely truncate medially, truncate portion somewhat irregularly denticulate and flanked by distinct angles. Clypeus in profile weakly concave, with median carina distinctly raised towards anterior and basal margins. Frontal triangle distinctly impressed; frontal carinae sinuate with narrowly and weakly raised margins; central area relatively wide with distinct frontal furrow. Sides of head in front of eyes rounding towards mandibular bases in weakly convex line; behind eyes sides rounding onto evenly convex occipital margin. Eyes convex, in full face view clearly breaking lateral cephalic outline. Ocelli lacking, position indicated by shallow pits in cephalic sculpture. Mesosomal dorsum elongated; pronotal dorsum with distinct humeral teeth; lateral margins evenly rounded into distinctly impressed promesonotal suture. Mesonotum with lateral margins distinctly converging towards rather flat, metanotal groove. Propodeal margins subparallel, terminating posteriorly in obliquely raised, subparallel, acute spines; propodeal dorsum flat, descending abruptly in medially uninterrupted line into steeply concave declivity. Petiole in side view with anterior and posterior faces virtually parallel from base; dorsum armed with slender, strongly raised, divergent and acute lateral spines; bases of spines continuous medially onto narrow dorsum and merging into two widely separated, blunt intercalary teeth. Anterior face of first gastral segment only weakly concave, widely rounding onto dorsum.



Figs 1-7. *Polyrhachis (Campomyrma)* spp: (1-2, 4-5) *P. smithersi* sp. n.; (3, 6-7) *P. fuscipes* Mayr. (1, 3) head in full face view; (2) petiole in front view; (4, 6) dorsal view; (5, 7) lateral view.

Mandibles finely striate at bases, rather irregularly rugose towards masticatory borders with shallow pits. Head rather finely, dorsum of mesosoma more coarsely reticulate-punctate, with former somewhat semipolished; sides of mesosoma very finely reticulate-wrinkled. Gaster finely sculptured, opaque; sculpturation somewhat finer and semipolished in some specimens.

Mandibles with numerous suberect, golden hairs near masticatory borders. Anterior clypeal margin with a few long setae medially; clypeus and frontal carinae with paired, medium length, golden hairs; hairs absent from vertex, dorsum of mesosoma, petiole and most of gastral dorsum. Several longer, golden, semierect hairs on apex and venter of gaster; occasional erect hairs on venter of coxae and fore femora. Closely appressed pubescence very sparingly distributed on various dorsal surfaces, notably on head and gaster.

Black; mandibles, except teeth, distinctly orange-red; legs orange-red to reddish-brown, coxae and tarsi a shade darker. Antennae medium reddish-brown; funiculi reddish-brown at base, with segments progressively lighter towards apices. Gaster reddish-brown with margins of segments lined a shade darker.

Queen. Dimensions: TL c. 7.51; HL 1.65; HW 1.37; CI 83; SL 1.68; SI 123; PW 1.28; MTL 1.96 (1 measured).

The single available queen is rather small, about the size of a small worker. However, it displays the usual characters identifying full sexuality, including three ocelli, complete thoracic structure and wings. Pronotal humeri bluntly angular; mesoscutum virtually as long as wide in dorsal view with lateral margins strongly converging anteriorly into rather narrowly rounded anterior margin; median line distinct; parapsides flat; mesoscutum in profile with relatively low anterior face rounding onto flat dorsum. Mesoscutellum flat, not elevated above dorsal plane of mesosoma. Propodeal dorsum weakly convex, descending into steep, weakly concave declivity in medially uninterrupted line; propodeal spines shorter than in worker, weakly divergent. Petiole virtually identical to that in worker, except for absence of intercalary teeth. Sculpturation of body, pilosity, pubescence and colour virtually as in worker.

Male and immature stages unknown.

Etymology. It is a pleasure to name this species for the late Courtenay Smithers, a generous and productive entomologist who left a lasting legacy of insect studies in Australia.

Remarks. *Polyrhachis smithersi* is so far known only from the type locality, with all specimens collected foraging at night on *Eucalyptus* tree trunks in open forest.

***Polyrhachis fuscipes* Mayr, 1862**

(Figs 3, 6-7)

Polyrhachis fuscipes Mayr, 1862: 679. Holotype worker. Type locality: TASMANIA (as Van Diemensland), NHMW.

Polyrhachis fuscipes Mayr; Roger, 1863: 9. Junior synonym of *P. hexacantha*.

Polyrhachis fuscipes Mayr; Dalla Torre, 1893: 263. Junior synonym of *P. hexacantha*.

Polyrhachis hexacantha subsp. *fuscipes* Mayr; Emery, 1925: 179. Combination in *P. (Campomyrma)* and revived from synonymy as subspecies of *P. hexacantha*.

Polyrhachis fuscipes Mayr; Taylor and Brown, 1985: 134. Revived status as species.

Polyrhachis semipolita subsp. *hestia* Forel, 1911: 295. Holotype worker. Type locality: Australia (Bates), ZMSG (examined).

Polyrhachis fuscipes Mayr; Taylor, 1989: 23. Senior synonym of *P. hestia*.

Additional material examined. NEW SOUTH WALES (including Australian Capital Territory): Thredbo, 30.ii.1982 (A.N. Andersen) (w); 12 km of Kanangra Walls N.P., 2.ii.1977, sclero. (B.B. Lowery) (w); Smokers Gap, 35°31'S, 148°54'E, 1240 m, 28-29.x.1973, dry open forest, at night (R.J. Kohout acc. 73.139) (w); ditto, 20.i.1982 (RJK acc. 82.40) (w); ditto, 18-19.ii.2001 (RJK acc. 01.8) (w); Jenolan Caves (J.C. Wilburt) (w). VICTORIA: Mt Oberon, Wilson's Promotory, 24.ii.1982 (A.N. Andersen) (w); Forrest (H.W. Davey) (w); Victoria (no further data) (w). TASMANIA: 15 km W of Swansea, xi.2003 (N. Meeson) (w); Hobart (A.M. Lea) (w).

Worker. Dimensions: TL c. 7.81-8.87; HL 1.96-2.12; HW 1.62-1.81; CI 81-85; SL 2.10-2.37; SI 126-136; PW 1.28-1.47; MTL 2.43-2.65 (9 measured).

Remarks. *Polyrhachis fuscipes* is known from the mountainous parts of southeastern NSW and ACT, and south through the Victorian Alps to Tasmania. It was collected in sympatry with *P. smithersi* and *P. hexacantha* at Smokers Gap in ACT.

***Polyrhachis hexacantha* (Erichson, 1842)**

(Figs 8-9, 10-11)

Formica hexacantha Erichson, 1842: 260. Syntype worker, queen (lectotype and paralectotype designated by Taylor, 1989: 24). Type locality: TASMANIA, ?Woolnorth (?A. Schayer), MNHU (worker examined).

Polyrhachis hexacantha (Erichson); Fr. Smith, 1858: 74. Combination in *Polyrhachis*.

Polyrhachis hexacantha (Erichson); Emery, 1925: 179. Combination in *P. (Campomyrma)*.

Polyrhachis froggatti Forel, 1910: 89. Syntype workers. Type locality: NEW SOUTH WALES, Bombala (W.W. Froggatt), ANIC, QMBA (examined).

Polyrhachis hexacantha (Erichson); Taylor, 1989: 24. Senior synonym of *P. froggatti* Forel.

Additional material examined. NEW SOUTH WALES (including AUSTRALIAN CAPITAL TERRITORY): NSW (no further data) (W.M. Wheeler) (w); Mt Kosciusko, The Creel, 3000', 14-15.xii.1931 (W.M. Wheeler, Harvard Aust. Exp.) (w); Mt Kosciusko, viii.1957 (Darlingtons) (w); Kosciusko NP, Island Bend, 26.xi.1952 (A. Musgrave) (w); ditto, 24.i.1975 (P. Ward #597) (w); Jenolan Caves (J.C. Wilburt) (w). ACT, Blundells Creek, 2600', 18.xii.1931 (W.M. Wheeler, Harvard Aust. Exp.) (w); Smokers Gap, 35°31'S, 148°54'E, c. 1240 m, 7 & 10.xi.1973 (RJK accs 73.196 & 204) (w). VICTORIA: Mt Buffalo, 4500' (F.E. Wilson) (w); ditto, 5000 ft, 8.ix.1958 (B.B. Lowery) (w). TASMANIA: Tasmania (no further data) (A.M. Lea) (w); Derby (41°08'S, 147°47'E), 10.i.1949 (T. Greaves) (w); Oatlands (42°18'S, 147°22'E), 10.x.1956 (J. McAreavey) (w); University Reserve, xi.2003 (N. Meeson) (w); Trevallyn, 19.iii.1928 (V.V. Hickman) (w).

Worker. Dimensions (syntypes of *hexacantha* cited first, *froggatti* second): TL c. 7.81, 9.27, 7.81-9.27; HL 1.96, 2.25, 1.96-2.25; HW 1.53, 1.87, 1.53-1.87; CI 78, 83, 78-83; SL 2.18, 2.46, 2.18-2.46; SI 142, 131, 131-142; PW 1.22, 1.56, 1.22-1.56; MTL 2.65, 2.96, 2.59-3.03 (2+8 measured).



Figs 8-14. *Polyrhachis* (*Campomyrma*) spp: (8-9, 11-12) *P. hexacantha* (Erichson); (10, 13-14) *P. semipolita* André. (8, 10) head in full face view; (9) petiole in front view; (11, 13) dorsal view; (12, 14) lateral view.

Remarks. *Polyrhachis hexacantha* is very similar to *P. fuscipes* but differs by the sculpturation of the body consisting of very closely spaced reticulate punctations that gives specimens a rather dull, opaque appearance. In contrast, the sculpturation of the body in *P. fuscipes* is distinctly finer, notably on the head, and on the mesosomal dorsum it forms more-or-less longitudinal striae with a somewhat semipolished appearance. The intercalary spines in *P. hexacantha* are rather long, while in *P. fuscipes* they are distinctly shorter. Both species co-occur with *P. smithersi* at Smokers Gap in ACT.

***Polyrhachis semipolita* André, 1896**

(Figs 10, 13-14)

Polyrhachis semipolita André, 1896: 251. Syntype workers. Type locality: AUSTRALIA, Victorian Alps, ANIC (examined).

Polyrhachis hexacantha subsp. *semipolita* André; Emery, 1898: 228. Subspecies of *P. hexacantha*.

Polyrhachis hexacantha subsp. *semipolita* André; Emery, 1925: 179. Combination in *P. (Campomyrma)*.

Polyrhachis semipolita André; Clark, 1934: 72. Revived status as species.

Additional material examined. NEW SOUTH WALES (including AUSTRALIAN CAPITAL TERRITORY): Buccleuch St. Forest (35°21'S, 139°53'E), S of Wee Jasper, 3300 ft, dry sclero, carton nest, 15.x.1995 (B.B. Lowery) (w); Mt Gemini, c. 6000 ft, 22.xii.1975, under snow gums at edge of sphagnum moss swamp (B.B. Lowery) (w). VICTORIA: Emerald, 37°56'S, 145°26'E, 9.xii.1934 (J. Clark) (w); Victoria (no other data) (Narri-Warren) (w). TASMANIA: Mt Nelson, 42°55'S, 147°20'E, 10.xii.1956 (J. McAreavey) (w); ditto, 2.i.1991, dry sclero, ex carton material mound (B.B. Lowery) (w); 4 mi N of Dover (43°20'S, 147°00'E), 15.i.1949 (T. Greaves) (w); 15 km W of Swansea xi.2003 (N. Meeson) (w); Cunningham, xi.2003 (N. Meeson) (w).

Worker. Dimensions: TL c. 7.91-8.87; HL 2.00-2.18; HW 1.68-1.87; CI 84-90; SL 2.25-2.43; SI 126-134; PW 1.43-1.62; MTL 2.59-2.90 (8 measured).

Remarks. With its highly polished body, *P. semipolita* is a very easily recognised member of the *hexacantha* complex. Like the other members it occurs in the mountainous parts of southeastern NSW and the ACT to the Victorian Alps and as far south as Tasmania.

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